

What is claimed is:

1. A display device, comprising:  
5 an image-generating arrangement configured to reproduce images, the images being visible to a viewer when the device is operated in either or both of two modes, including a first mode wherein the device produces a real image of the image-generating arrangement, and a mode wherein the device produces a virtual image of the image-generating arrangement.
- 10 2. A display device as defined in claim 1, wherein the image-generating arrangement is a microdisplay.
3. A display device as defined in claim 2, wherein the microdisplay is a liquid  
15 crystal microdisplay.
4. A display device as defined in claim 3, wherein the liquid crystal microdisplay is a ferroelectric liquid crystal microdisplay.
5. A display device as defined in claim 3, wherein the liquid crystal microdisplay is  
20 a nematic liquid crystal microdisplay.
6. A display device as defined in claim 2, wherein the microdisplay is a digital  
micromirror device.
- 25 7. A display device as defined in claim 2, wherein the microdisplay is a TFT device.
8. A display device as defined in claim 2, wherein the microdisplay is an OLED  
device.
- 30 9. A display device as defined in claim 1, further comprising one or more light source arrangements external to the image-generating arrangement that emit light and cooperate with the image-generating arrangement to produce the images during either or both of the modes.



10. A display device as defined in claim 9, wherein at least one of the one or more light source arrangements includes each of a red, a green, and a blue LED.

11. A display device as defined in claim 9, wherein the device includes one and only  
5 one light source arrangement.

12. A display device as defined in claim 9, wherein the device includes at least two light source arrangements.

10 13. A display device as defined in claim 9, further comprising a light source drive arrangement that establishes the intensity of the light from the one or more light source arrangements.

14. A display device as defined in claim 13, wherein the intensity of the light  
15 established by the light source drive arrangement relates to the image-review mode in which the display device is being operated.

15. A display device as defined in claim 1, further comprising a mode-selection arrangement that establishes the modes in which the display device is being operated.  
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16. A display device as defined in claim 15, wherein the mode-selection arrangement includes a switch having at least two positions that allows an operator of the device to select the desired image-review mode.

25 17. A display device as defined in claim 15, further comprising an eyepiece in which an operator of the device can look to view the virtual image of the image-generating arrangement when the device is operated in the second mode.

18. A display device as defined in claim 17, wherein the mode-selection arrangement  
30 includes a proximity sensor that senses when the operator of the device is looking into the viewfinder.



19. A display device as defined in claim 15, further comprising an image screen upon which the real image of the image-generating arrangement appears when the device is operated in the first mode.

5 20. A display device as defined in claim 19, wherein the image screen is moveable between at least two positions, an active position for use when the first mode is in operation, and an inactive position for use when the first mode is not in operation.

10 21. A display device as defined in claim 20, wherein the mode selection arrangement senses the position of the image screen and accordingly establishes the mode in which the device is operated.

15 22. A display device as defined in claim 19, further comprising a sensing arrangement that determines the position of a pointing device in relation to the image screen.

23. A display device as defined in claim 19, wherein the image screen is polarized to reject at least a portion of the ambient light present in the device's operating environment.

20 24. A display device as defined in claim 19, wherein the image screen has non-unity gain.

25 25. A display device as defined in claim 1, wherein the virtual image follows a first optical path to a virtual image location and the real image follows a second optical path to a real image location.

26. A display device as defined in claim 25, wherein the first optical path and the second optical path are nowhere coincident.

30 27. A display device as defined in claim 25, wherein the first and the second optical paths are substantially coincident.

28. A display device as defined in claim 25, wherein the first and second optical paths are only partially coincident.



29. A display device as defined in claim 25, wherein at least a portion of the second optical path is external to the display device.

5 30. A display device as defined in claim 1, wherein the real image is formed external to the display device.

31. A display device as defined in claim 1, wherein the display device is a digital still camera.

10 32. A display device as defined in claim 1, wherein the display device is a video camera.

15 33. A display device as defined in claim 1, wherein the display device is a portable telecommunication device configured to receive images electronically from an external source.

34. A display device as defined in claim 1, wherein the display device is a personal digital assistant configured to receive images electronically from an external source.

20 35. A device for producing images, the device comprising:  
an illumination arrangement;  
a reflective spatial light modulator in optical communication with the illumination arrangement, the SLM configured to modulate the light from the illumination arrangement so as to produce images;

25 a first lens arrangement that focuses images produced by the SLM such that the focused image appears at a first viewing area, the viewing area being the position of a viewer's retina when the device is operated in a first mode; and

30 a second lens arrangement that projects images produced by the SLM such that the projected images appear at a second viewing area when the device is operated in a second mode, the second viewing area being visible by more than one viewer.



36. In a device for producing images, the device including an image generating arrangement configured such that multiple viewers can simultaneously view the images produced by the device, the improvement comprising:

an arrangement that creates a second image of the image generating arrangement that  
5 allows viewing essentially by only one viewer at a time.

37. A display device embedded in an image capture device, comprising:

a housing containing the image capture device;

a microdisplay located in the housing;

10 a light source located in the housing;

a first optical path from the light source to a viewing location; and

a second optical path from the light source to a projected image location;

wherein either the first or the second optical path can be selected.

15 38. A display device embedded in an image capture device that captures images, the display device comprising:

a microdisplay;

a first optical arrangement that provides a viewable image of the microdisplay at a near-eye viewing location; and

20 a second optical arrangement that provides a projected image at a projected image location;

wherein either the first optical arrangement or the second optical arrangement can be selected.

25 39. A method of displaying images captured by an image capture device, comprising:

providing a microdisplay;

providing an optical path from the microdisplay to a viewing area where an image of the microdisplay can be viewed; and

providing an optical path from the microdisplay to a projected image location.